ATTENTION

The following document is a FINAL DRAFT of the revised "Recommended Shipbuilding Construction Guidelines for Cruise Vessels Destined to Call on U.S. Ports" . This DRAFT was prepared following a meeting between the Vessel Sanitation Program staff and representatives of vessel owners and shipyards, private consultants and other interested parties on April 17-18, 2001.

This DRAFT is for review and discussion purposes ONLY. This DRAFT is designated as "Revised MAY 2001".

In developing the DRAFT, we have used "~~strike-out~~" to denote items in the previous drafts that are being deleted, and "red-line" to denote items that have been added.

VSP will accept written comments on this DRAFT prior to finalizing the document. **Comments on this FINAL DRAFT will be accepted through June 15, 2001.**

Comments should be directed to Dave Forney, Chief, VSP at Dforney@cdc.gov, or fax: (770) 488-4127 or mail to VSP, 4770 Buford Hwy, N. E., Mailstop F16, Atlanta GA USA 30341-3724.

REVISED DRAFT MAY 2001

RECOMMENDED SHIPBUILDING CONSTRUCTION GUIDELINES

FOR CRUISE VESSELS DESTINED TO CALL ON U. S. PORTS

VESSEL SANITATION PROGRAM

NATIONAL CENTER FOR ENVIRONMENTAL HEALTH

CENTERS FOR DISEASE CONTROL AND PREVENTION

United States PUBLIC HEALTH SERVICE

REVISED DRAFT MAY 2001

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Recommended Shipbuilding Construction Guidelines for Cruise Vessels Destined To Call on United States Ports

1.0 BACKGROUND AND PURPOSE

The Centers for Disease Control and Prevention (CDC) established the Vessel Sanitation Program (VSP) in 1975 as a cooperative endeavor with the cruise industry to assist the industry in fulfilling its responsibility for developing and implementing comprehensive sanitation programs to protect the health of passengers and crew members aboard cruise vessels.

Every cruise vessel that has a foreign itinerary and that carries 13 or more passengers and calls on a United States port is subject to biannual operational inspections and when necessary, to reinspection by the VSP. The vessel owner pays a fee, based on gross registered tonnage (GRT) of the vessel, for all operational inspections. Details of these inspections are covered in the *VSP Operations Manual 2000*, which is available on the VSP web site at www.cdc.gov/nceh/vsp.

Additionally, on a voluntary basis, cruise vessel owners or shipyards that build or renovate cruise vessels may request plan reviews, on-site shipyard construction and/or final construction inspections of new or remodeled vessels before their first or next operational inspection, as the case may be. The vessel owner or shipyard pays a fee, based on GRT of the vessel, for on-site and final construction inspections. No fee is charged for plan reviews or consultations. Details pertaining to plan reviews, consultations, or construction inspections are covered in Section 3.0, Procedures for Making Requests for Plan Reviews and Construction-Related Inspections.

The primary purpose of these guidelines is to provide a framework of consistency for the sanitary design and construction of cruise vessels in order to protect the health of passengers and crew aboard ship. CDC is committed to promoting high construction standards to protect the public's health and believes compliance with these recommended construction guidelines will help ensure a healthful environment on cruise vessels.

In developing this document, CDC reviewed many references from a variety of sources for general guidance. These references are listed in Section 29.2, Standards, Codes and Other References Reviewed for Guidance.

CDC has provided construction guidelines for various components of the vessel's facilities related to public health, such as food storage, preparation, and service; water bunkering, storage, disinfection, and distribution. It is CDC's position that vessel owners and operators have the choice of selecting the type of equipment that best meets their needs. However, the equipment selected must be maintained over time to meet VSP routine operational inspection requirements.

It is not CDC's intention or purpose to limit the introduction of new designs, materials or technology for shipbuilding. A shipbuilder, owner, manufacturer, or other interested party may request that VSP periodically review or revise these construction guidelines on the basis of new information or technology. The VSP will review such requests in accordance with the criteria described in Section 2.0, Revisions and Recommended Changes.

New cruise vessels shall comply with all international code requirements (e.g., International Maritime Organization (IMO) Conventions, including the Safety of Life-at-Sea Convention (SOLAS), the International Convention for the Prevention of Pollution from Ships (MARPOL), the Tonnage and Load Line Convention, International Electric Code (IEC), International Plumbing Code (IPC), and International Standards Organization (ISO). This document does not cross-reference related, and sometimes overlapping standards that new cruise vessels must meet.

These guidelines will apply to all newbuildings for which the keel is laid after June 1, 2001. They will also apply to major renovations performed after June 1, 2001. A major renovation is defined as any change in the structural elements of the vessel covered by these guidelines. The guidelines will not apply to minor renovations. Minor renovations are small changes, such as the installation or removal of single pieces of equipment (e.g., refrigerator units, bain marie units) or single pipe runs. These guidelines will apply to all areas of the vessel effected by the renovation. The entire ship will always be critiqued in accordance with the Vessel Sanitation Program's Operation Manual during routine vessel sanitation inspections and reinspection.

2.0 REVISIONS AND RECOMMENDED CHANGES

The VSP, in cooperation with the industry, will periodically review and revise the *Recommended Shipbuilding Construction Guidelines for Cruise Vessels Destined to Call on United States Ports.* VSP will give special consideration to ships that have had plan reviews prior to a new revision becoming effective to insure unfair burden is not placed on the shipyards and owners to make excessive changes to newbuildings previously agreed upon.

A shipbuilder, owner, manufacturer, or other interested party may ask VSP to review a construction guideline based on new technologies, concepts, or methods. Recommendations for changes or additions to these guidelines shall be submitted in writing, to the Chief, VSP. Identify the section and describe the proposed change or addition and the reason for recommending the change or addition. Include research or test results and any other pertinent information that supports the change or addition. The VSP will coordinate a professional evaluation and consult with industry to determine whether the recommendation shall be included in the next revision.

CDC recognizes that the shipbuilding and cruise industries are constantly evolving and that these guidelines may require periodic revision. Our intent is to periodically ask industry representatives and other knowledgeable parties to meet with us to review the guidelines and determine whether changes are necessary to keep up with the innovations in the industry.

3.0 PROCEDURES FOR MAKING REQUESTS FOR PLAN REVIEWS, CONSULTATIONS, AND CONSTRUCTION-RELATED INSPECTIONS

In order to coordinate or schedule a plan review or construction-related inspection with the VSP, contact them early in the process and submit the official, written request as soon as possible in the planning, construction, or renovation process. CDC's ability to schedule and honor these requests shall be based on the availability of VSP staff. ***All official, written letters of requests for plan reviews, consultations, and construction-related inspections shall be directed to the Chief, VSP***. A complete listing of contact numbers is provided in Section 30.2, VSP Contact Numbers .

Once initial contact is made, VSP will assign a primary and secondary officer to coordinate with the vessel owner and shipyard; these officers shall be the point of contact for the vessel from the plan review and consultations through the final construction inspection. Points of contact representing, the owners, the shipyard,

and key subcontractors shall be established at the plan review. These points of contact will be utilized by all parties during consultations between any of the parties and VSP to ensure awareness of all consultative activities after the plan review.

3.1 Plan Reviews and Consultations

For newbuildings, plan reviews are normally conducted a minimum of 18-24 months before the vessel is scheduled for delivery. Because of the variable time lines associated with major renovations, the plan reviews for such projects shall be coordinated well before the work is begun, allowing time to make any necessary changes. Two officers will normally be assigned to conduct the review. Most plan reviews will take two working days and will be conducted in Atlanta or Fort Lauderdale. The review shall be attended by representatives from the shipyard, the vessel owner, and the subcontractor(s) who will be doing most of the work. These representatives shall bring all pertinent plans or drawings and equipment specifications for the areas covered in these guidelines, including but not limited to general arrangement plans; all food-related storage, preparation, and service area plans; potable and non-potable water system plans with details on water inlets, i.e., sea chests, outlets, and backflow protection devices; ventilation system plans; and, if applicable, swimming pool and whirlpool spa plans.

VSP will prepare a ***Plan Review Report*** summarizing the recommendations made during the plan review. This report will be submitted to the shipyard and owner representatives.

Following the plan review, the shipyard shall provide 1) a complete set of plans or drawings and specifications for the vessel, 2) any plans that are re-drawn and, 3) a statement of corrective action outlining how each of the items identified in the Plan Review Report will be corrected. Additionally, the VSP shall be sent copies of any major change orders in the areas covered by these guidelines that are made after the plan review, before the on-site construction inspection, or completion of the vessel. Any questions or requests for consultative services made to the VSP while the vessel is being built shall be directed in writing to the officer(s) assigned to the project and shall be coordinated with the owner and shipyard contact points designated during the plan review. The person sending the request shall include the fax numbers of the contact person or project manager for the vessel owner, shipyard or subcontractor so that they may receive a copy of the VSP's response. A sample request form is included in Section 30.2.

3.2 On-Site Construction Inspections

Most on-site or shipyard construction inspections are conducted in shipyards outside the United States. ***In order to process the required foreign travel orders, a formal, written letter of request must be submitted by the shipyard to the CDC, addressed to Chief, VSP, a minimum of 45 days before the inspection date***. A sample letter is included in Section 30.1, Sample Letter of Request. Shipyards are encouraged to call the VSP and coordinate on-site construction inspections well before the 45-day minimum to better plan the actual inspection dates. If a shipyard requests an on-site construction inspection, the vessel owner shall be advised of the inspection dates so that the owner's representatives are present. An on-site construction inspection normally requires the expertise of one to three officers, depending on the size of the vessel and whether it is the first of a hull design class or a subsequent hull in a series of the same class of vessels. The inspection, including travel, generally takes 5 working days. ***It shall be planned so that the on-site inspection is conducted approximately 4 to 5 weeks before delivery, and when the areas of the vessel to be inspected are approximately 90% completed***. Following the inspection, and before the ship's arrival in the United States, the shipyard shall submit to the VSP a statement of corrective action outlining how each item identified in the inspection report will be addressed and corrected.

3.3 Final Construction Inspections

At the request of a vessel owner or shipyard, a final construction inspection may be conducted by the VSP. A formal, written request shall be submitted to the Chief, VSP as soon as possible after the vessel is completed, a minimum of 10 days before its arrival in the United States Final construction inspections may be conducted outside the United States at the request of a vessel owner or shipyard if the vessel is not immediately entering the United States market. If a final construction inspection is not requested, then an unannounced operational inspection will generally be conducted by the VSP within 4 weeks of the vessel's arrival in the United States. Operational inspections are conducted in accordance with the *VSP Operations Manual 2000*.

After a final construction inspection, a statement of corrective action shall be submitted to the VSP as soon as possible outlining how each item identified in the inspection report will be addressed and corrected including the projected date of completion. Vessels that undergo a final construction inspection are generally scheduled for an unannounced operational inspection by the VSP within 6 weeks of the vessel's arrival in the United States.

Operational inspections are conducted in accordance with the *VSP Operations Manual*.

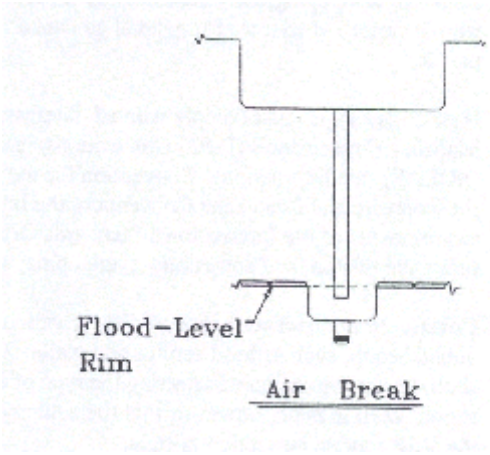
4.0 EQUIPMENT STANDARDS, TESTING, AND CERTIFICATION

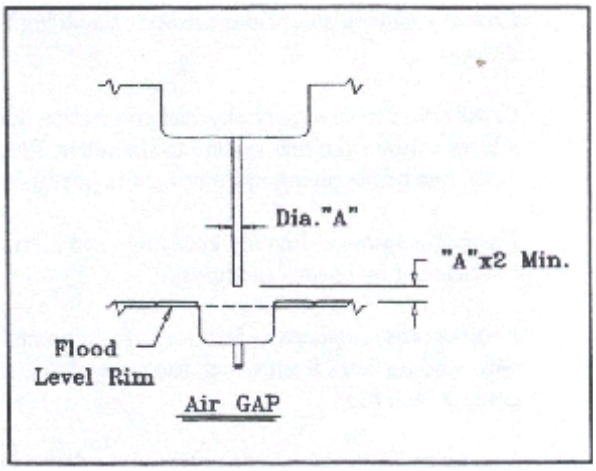
Although these guidelines establish certain standards for equipment and materials installed on cruise vessels, the VSP does not test, certify, or otherwise endorse equipment or materials used by the cruise industry. Instead, the VSP looks for certification from independent testing laboratories such as NSF International, Underwriter's Laboratories (UL), the American National Standards Institute (ANSI), or other accredited institutions. In most cases, independent testing laboratories test equipment and materials to certain minimum standards which generally, but in some cases may not, meet the recommended standards established by these guidelines. Copies of test or certification standards may be obtained from the previously mentioned independent testing laboratories. ***Equipment manufacturers and suppliers shall not be referred to the VSP to approve their products***.

5.0 GENERAL DEFINITIONS

Accessible - Capable of being exposed for cleaning and inspection with the use of simple tools such as a screwdriver, pliers, or an open-end wrench.

Air break - A piping arrangement in which a drain from a fixture, appliance, or device discharges indirectly into another fixture, receptacle, or interceptor at a point below the flood-level rim.





Air gap - The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood-level rim of the receptacle or receiving fixture. The air gap must be at least twice the diameter of the supply pipe or faucet or at least 25 mm (1 inch).

Backflow - The flow of water or other liquids, mixtures, or substances into the distribution pipes of a potable supply of water from any source or sources other than the potable water supply. Back siphonage is one form of backflow.

Backflow, check, or non-return valve - A mechanical device installed in a waste line to prevent the reversal of flow under conditions of back pressure. In the check-valve type, the flap should swing into a recess when the line is flowing full in order to preclude obstructing the flow.

Backflow preventer - An approved backflow prevention plumbing device that must be used on potable water distribution lines where there is a direct connection or a potential connection between the potable water distribution system and other liquids, mixtures, or substances from any source other than the potable water supply. Some devices are designed for use under continuous water pressure, whereas others are non-pressure types. To ensure proper protection of the water supply, a thorough review of the water system shall be made to confirm that the appropriate device is selected for each specific application. The following are general types of backflow preventers and their uses:

> *Atmospheric vacuum breaker* - An approved backflow prevention plumbing device utilized on potable water lines where shut-off valves do not exist downstream from the device. The device is not approved for use when installed in a manner such that it will be under continuous water pressure. An atmospheric vacuum breaker must be installed at least 152 mm (6 inches) above the flood level rim of the fixture or container to which it is supplying water.
>
> *Hose bib connection vacuum breaker* - An approved backflow prevention plumbing device that attaches directly to a hose bib via a threaded head. This device uses a single check valve and vacuum breaker vent. It is not approved

for use under continuous pressure (e.g., when a shut-off valve is located downstream from the device).

Continuous pressure backflow preventer - An approved backflow prevention plumbing device with two check valves and an intermediate atmospheric vent that is designed and approved for use under continuous water pressure (e.g., when shut-off valves are located downstream from the device).

Reduced Pressure Principle Backflow Prevention Assembly (RP Assembly) - An assembly containing two independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first check valve. The unit shall include properly located resilient seated test cocks and tightly closing resilient seated shutoff valves at each end of the assembly.

Back-siphonage - The flowing backward of used, contaminated, or polluted water from a plumbing fixture or vessel or other source into a water-supply pipe as a result of negative pressure in the pipe.

Black Water - Wastewater from water closets (toilets).

Blast Chiller - A unit specifically designed for rapid intermediate chilling of food products within a specified time period.

Child Activity Centers ~~*Facility*~~ - Facility for child-related activities where children under 6-years old are placed to be cared for by vessel staff. ~~designed for children 5 years of age and older, who do not need assistance or supervision when using the toilet~~.

~~*Child Care Facility* - Facility designed for children under 5 years of age and who need assistance and supervision when using the toilet.~~

~~*Condensate Water* -~~

Corrosion-resistant - Capable of maintaining original surface characteristics under prolonged influence of the use environment, including the expected food contact and the normal use of cleaning compounds and sanitizing solutions.

Coved - Having a concave surface or molding that eliminates the usual angles of ninety degrees or less.

Cross-connection - Any unprotected actual or potential connection or structural arrangement between a public or a consumer's potable water system and any other source or system through which it is possible to introduce into any part of the potable system any used water, industrial fluid, gas, or substance other than the intended potable water with which the system is supplied. Bypass arrangements, jumper connection, removable section, swivel or change-over devices and other temporary or permanent devices which or because of which backflow can occur are considered to be cross-connections.

~~*Distillate* -~~

Easily cleanable - Fabricated with a material, finish, and design that allows for cleaning by normal methods.

Food contact surfaces - Surfaces of equipment and utensils with which food normally comes in contact and surfaces from which food may drain, drip, or splash back onto surfaces normally in contact with food.

Food display areas - Any area where food is displayed for consumption by passengers and/or crew.

Food handling areas - Any area where food is stored, processed, prepared, ~~transported~~, or served.

Food preparation areas - Any area where food is processed, cooked, or prepared for service.

Food service areas - Any area where food is presented to passengers or crew members (excluding individual cabin service).

Food storage areas - Any area where food or food products are stored.

Food transport areas - Any area through which unprepared or prepared food is transported during food preparation, storage, and service operations (excluding individual cabin service).

Grey water - All wastewater except that coming from water closets (toilets)

Keel Laying - The date at which construction identifiable with a specific ship begins; and assembly of that ship has commenced comprising at least 50 tons or one per cent of the estimated mass of all structural material, whichever is less.

Non-food contact surfaces - All exposed surfaces, other than food contact or splash contact surfaces, of equipment located in food storage, preparation and service areas.

Non-potable fresh water - Fresh water that may not be halogenated, intended for use in technical and other areas where potable water is not required (e.g., laundries, engine room, toilets, waste-treatment areas, and for washing decks in areas other than the vessel's hospital, food service, preparation, or storage areas).

~~*Permeate* -~~

Potable water (PW) - Fresh water intended for drinking, washing, bathing, or showering; for use in fresh water swimming pools and whirlpool spas; for use in the vessel's hospital; for handling, preparing, or cooking food; and for cleaning food storage and preparation areas, utensils, and equipment. ~~Fresh water intended for drinking, washing, bathing, or showering; for use in the vessel's hospital; for handling, preparing, or cooking food; and for cleaning food storage and preparation areas, utensils, and equipment. Potable water shall meet the World Health Organization's (WHO) *Guidelines for Drinking Water Quality*, especially the bacteriological, chemical, and physical requirements.~~

Potable water tanks - All tanks in which potable water is stored from bunkering and production for distribution and use as potable water.

Portable - Equipment that is readily removable or mounted on casters, gliders, or rollers; or provided with a mechanical means to safely tilt a unit or equipment for cleaning, or readily movable by one person.

Readily accessible - Exposed or capable of being exposed for cleaning or inspection without the use of tools.

Readily removable - Capable of being detached from the main unit without the use of tools.

Removable - Capable of being detached from the main unit with the use of simple tools such as a screwdriver, pliers, or an open end wrench.

Safe material - An article manufactured from or composed of materials that may not reasonably be expected to result, directly or indirectly, in their becoming a component or otherwise affecting the characteristics of any food; an additive that is used as specified in Section 409 or 706 of the Federal Food, Drug, and Cosmetic Act; or other materials that are not additives and that are used in conformity with applicable regulations of the FDA.

Sealant - Material utilized for the filling of seams to prevent the entry or leakage of liquid or moisture.

Sealed - Having no openings that will permit the entry of soil or seepage of liquids.

Sealed seam - A seam having no openings that will permit the entry of soil or liquid seepage.

Seam - An open juncture between two similar or dissimilar materials. Continuously welded junctures, ground and polished smooth, are not considered seams.

Scupper - to be developed

Sewage - Any liquid waste containing animal or vegetable matter in suspension or solution, including liquids containing chemicals in solution.

Smooth - means:

a) A food contact surface, having a surface free of pits and inclusions, having a cleanability equal to or exceeding that of a No. 3 finish (100 grit) on stainless steel;

b) A non-food contact surface of equipment having a surface equal to that of commercial grade hot-rolled steel free of visible scale; and

c) A deck, bulkhead, or deckhead having an even or level surface with no roughness or projections that render it difficult to clean.

Splash contact surfaces - Surfaces that are subject to routine splash, spillage or other soiling during normal use.

Direct splash surfaces - Areas adjacent to food contact surfaces that are subject to splash, drainage, or drippage onto food contact surfaces.

Indirect splash surfaces - Areas adjacent to food contact surfaces that are subject to splash, drainage, drippage, condensation, or spillage from food preparation and storage.

~~*Splash proof* -~~

Technical Water -Fresh water NOT intended for drinking, washing, bathing, or showering; for use in the vessel's hospital; for handling, preparing, or cooking food; and for cleaning food storage and preparation areas, utensils, and equipment.

Utility Sink - Any sink located in a food service area not used for handwashing and/or warewashing.

~~*Variance* - A written document issued by the VSP that authorizes a modification or waiver of one or more of these guidelines if, in the opinion of the VSP, a health hazard or nuisance will not result from the modification or waiver~~.

~~*Water tight* -~~

6.0 GENERAL FACILITIES REQUIREMENTS

6.1 Size and Flow

The size of rooms or areas and the flow of food through a vessel is determined by many factors and is influenced largely by the previous experience of the owner. The size of the vessel, number of passengers and crew, the various types of foods or menus, the number of meals or mealtimes, the service or presentation of meals, and the itinerary of a vessel are many, but not all, of the factors to be considered. In general, food storage, preparation, and service areas; warewashing areas; and waste management areas shall be of adequate size to accommodate the number of passengers and crew on the vessel. Bulk food storage areas or provisions (frozen stores, refrigerated stores, and dry stores) shall be adequate for the vessel's itinerary. Adequate refrigeration and hot holding facilities, including temporary storage facilities, shall be available for all food preparation and service areas and for foods being transported to remote areas.

The flow of food through a vessel shall be arranged in a logical sequence that minimizes cross-traffic or backtracking and that allows for adequate separation of clean and soiled operations. An orderly, functional flow of food from the purveyor at dockside through the storage, preparation, and finishing areas to the service areas and finally, to the waste management area, shall be provided. With flow, the goal is smooth, rapid production and service,

conducted in accordance with strict temperature-control requirements, while minimizing time and handling.

The adequacy of the size of a particular room or area and the flow of food through the vessel to those rooms or areas shall be evaluated primarily during the plan review process.

6.2 Equipment Requirements for galleys, and recommended for other food preparation areas.

6.2.1 The following is a list of equipment required in galleys, and in other areas depending on the level of service:

6.2.1.1 Blast chillers ~~shall~~ should be incorporated into the design of passenger and crew galleys. More than one unit may be necessary ~~required~~ depending on the size of the vessel, the unit's intended application, and the distances between the chillers and the storage and service areas.

6.2.1.2 Food preparation sinks shall be located in as many areas as necessary (i.e., in all meat, fish, and vegetable preparation rooms; cold pantries or garde mangers; and in any other areas where washing or soaking of food is conducted). An automatic vegetable washing machine may be used in addition to food preparation sinks in vegetable preparation rooms.

6.2.1.3 Storage cabinets, shelves, or racks shall be provided for food products, condiments, and equipment in food storage, preparation, and service areas, including bars and pantries.

6.2.1.4 Portable tables, carts, or pallets shall be provided in areas where food or ice is dispensed from cooking equipment, such as from soup kettles, steamers, braising pans, tilting skillets, or ice storage bins. A storage cabinet or rack shall be provided for large items such as ladles, paddles, whisks, and spatulas.

6.2.1.5 Easily cleanable knife lockers that meet food contact standards.

6.2.1.6 Storage areas, cabinets, or shelves for waiter trays.

6.2.1.7 Dishware lowerators or similar dish storage and dispensing cabinets.

6.2.1.8 An adequate number of work counters or food preparation counters so as to provide sufficient work space.

6.2.1.9 Drinking fountains.

6.2.1.10 Cleaning lockers.

6.2.2 The main pot washing area(s) shall have at a minimum, a three compartment sink with a pre-wash station or a four-compartment sink with an insert pan and an overhead spray. The sinks shall be designed to handle the largest piece of equipment used in the areas that it serves. Automatic warewashing machines with separate pre-wash stations may be used in addition to the three-compartment sinks, provided the machines are sized to the equipment being washed. A single-door, pass-through type warewashing machine is preferable to an undercounter model.

6.2.3 Heavy-use areas, such as bakeries, butcher shops, and other preparation areas may require a pre-wash station (including overhead spray) or a four-compartment sink with an insert pan and an overhead spray depending on size of facilities, distance to central pot washing facilities, and other such factors.

6.2.4 All food preparation areas shall have easy access to a three-compartment utensil washing sink or a warewashing machine equipped with a dump sink and a pre-wash hose.

6.2.5 Beverage dispensing equipment shall have readily removable drain pans, or built-in drains in the tabletop.

6.2.6 Provide storage areas for all equipment and utensils such as ladles and cutting blades used in food preparation areas

6.2.7 Ensure all installed equipment requiring drains are designed to direct food and wash water drainage into a container, deck drain scupper, or deck sink, and not directly or indirectly onto a deck.

6.2.8 In areas such as beverage stations where it is necessary to refill pitchers or dispensers or discard liquids such as coffee, provide a utility sink. Provide ice cream, sherbert, or similar product dipper wells with running water and proper drainage.

6.2.9 Provide adequate protection for openings to ice bins, food display cases, and other such food and ice holding facilities with tight fitting doors or similar protective closures that prevents contamination of the products held inside.

6.2.10 Protect countertop openings and rims of food cold tops, bains-marie, ice wells, and other drop-in type food and ice holding units with a raised integral edge or rim of at least 5 mm (3/16 inch) above the counter level around the opening.

6.3 Equipment Surfaces

6.3.1 In general, all food contact, splash contact and exposed non-food contact surfaces shall be smooth, durable, noncorroding and designed to preclude unnecessary edges, projections, or crevices and easily cleanable.

6.3.2 Ensure that all food contact surfaces consist of materials approved for food contact. Food contact surfaces shall be smooth, durable, noncorroding, easily cleanable, readily accessible, maintainable, provided with coved corners, and preferably seamless in accordance with current ANSI/NSF standard for food service equipment. ~~The surfaces shall be designed to preclude unnecessary edges, projections, or crevices, and shall be readily accessible for cleaning.~~ External corners and angles shall be formed with a sufficient radius to permit proper drainage and shall exhibit no sharp edges. Only sealants certified to ANSI/NSF, i.e., NSF Standard 51, criteria are approved for use on food contact and food splash surfaces. Approved sealants may be used to seal seams in limited application when practical function or design requires. Avoid excessive use of sealant.

6.3.3 Splash contact surfaces shall consist of materials that are approved for food contact and shall have smooth, easily cleanable surfaces, readily accessible, and exhibiting no sharp edges. Splash contact surfaces shall be smooth, durable and noncorroding.

6.3.4 Non-food contact surfaces shall be durable and noncorroding. Exposed surfaces shall be smooth, easily cleanable, and accessible.

6.4. Bulkheads, Deckheads and Decks

6.4.1 Bulkhead and deckhead construction shall preclude the use of exposed fasteners. All seams between adjoining deckhead or bulkhead panels that are more than 1mm (1/32 inch) but less than 3 mm (1/8 inch) may be sealed with an approved sealant. All seams greater than 3 mm (1/8 inch) shall be covered with ~~stainless steel~~ appropriate profile strips. All bulkhead and deckhead penetrations through which pipes or other conduits pass shall be properly sealed, and where gaps are greater than 3 mm (1/8 inch), stainless steel collars shall be used.

6.4.2 All bulkheads shall be sufficiently reinforced to prevent panels from buckling or becoming detached under normal operating conditions.

6.4.3 Door penetrations shall be completely welded indentations with no open voids. Locking pins shall be inserted into inverted nipples. This also applies to the penetrations around fire doors, in the thresholds and in bulkhead openings.

6.4.4 Durable coving of at least a 10 mm (3/8 inch) radius shall be installed as an integral part of the deck and bulkhead interface and at the juncture between decks and equipment foundations. Stainless steel or other coving, if installed, shall be of sufficient thickness so as to be durable and securely installed.

6.4.5 Decks shall be hard, durable, easily cleanable, non-skid and non-absorbent. Completely seal all deck penetrations through which pipes or other conduits pass.

6.5 Deck Drains and Scuppers

6.5.1 Deck drains, scuppers, ~~sinks~~ and deck sinks shall be constructed of stainless steel with smooth finished surfaces, be accessible for cleaning, designed to drain completely and large enough to prevent overflow to adjacent deck surfaces.

6.5.2 Scupper and deck sink cover grates shall be constructed of stainless steel or other approved material that meets the requirements of a smooth, easily cleanable surface, strong enough to maintain its original shape and to exhibit no sharp edges. They shall be tight-fitting, readily removable for cleaning, and uniform in length (e.g., 1 meter or 3 feet), where practical, so they are interchangeable.

6.5.3 Locate deck drains, scuppers, and deck sinks in low-traffic spaces, such as in front of soup kettles, boilers, tilting pans, or braising pans and size the deck drains, scuppers, and sinks in order to eliminate spillage and overflow to adjacent deck surfaces.

~~6.5.4 Construct deck scupper channels of stainless steel, with smooth finished surfaces and size the channels to preclude ponding and spillage onto the deck.~~

6.5.4 Provide sufficient deck drainage in all food service areas to prevent liquids from pooling on the decks.

6.5.5 Deck and scupper drain lines shall be a minimum of 65 mm (2 ½ inches) in diameter. Drains and scuppers shall be ~~sloped to the collecting drain~~ designed to drain completely.. Provide cross-drain connections in order to preclude ponding and spillage from the scupper when the vessel is listing.

6.5.6 Ramps over thresholds shall be easily removable or sealed in place, sloped for easy roll-in and roll-out of trolleys, and be strong enough to maintain their shape. Ramps over scupper covers may be constructed as an integral part of the scupper system, provided that they are cleanable and durable.

6.5.7 Deck sinks may not be used as substitutes for deck drains. Independent deck drains are required.

~~6.5.8 Drain lines from the evaporators in cold storage facilities shall be sloped and extend through the bulkheads or deck and drain to a deck scupper, or drain through an accessible air gap or air break.~~

7.0 GENERAL HYGIENE FACILITIES REQUIREMENTS

7.1 Handwashing Stations

7.1.1 Construct handwashing sinks of stainless steel, or other similar durable materials and provide hot and cold running water from a single mixing faucet.

7.1.2 Ensure that handwashing stations include a suitable soap dispenser, a paper towel dispenser, a corrosion-resistant waste receptacle, and splash panels where necessary to protect adjoining equipment. Paper towel dispensers and waste towel receptacles shall be either permanently sealed or readily removable for cleaning if attached to the bulkhead.

7.1.3 Provide an adequate number of bucket filling stations, below the handwashing sinks. Each bucket filling station shall be provide hot and cold water supplied through a mixing valve to a faucet with the appropriate backflow protection. Provide appropriate deck drainage (e.g.; scupper) under all bucket filling stations.

7.1.4 Install handwashing stations throughout the food service, preparation**,** and warewashing areas so that no employee must walk more than 8 m (25 feet) to reach a station. (Waiter stations are excluded) Handwashing sinks shall be approximately 750 mm (30 inches) above the deck. Travel through a normally closed door to reach a handwashing station shall be avoided. Employees shall not be required to squat or reach excessively to wash their hands at a handwashing sink.

7.1.5 Install a sufficient number of handwashing sinks at the soiled dish drop-off area in the main galley to allow quick turn-around time for employees bringing soiled dishware from the dining rooms or other food service areas and avoid long waiting lines at handwashing stations.

7.1.6 Install easy-to-operate, sanitary faucet handles, elephant ear handles, foot pedals, knee pedals, or electronic sensors on handwashing sinks in food service areas. A self-closing, slow-closing, or metering faucet shall provide a flow of water for at least 15 seconds without the need to reactivate the faucet.

7.1.7 Install permanent signs in English (and other ~~appropriate~~ languages where appropriate), indicating that frequent handwashing is required.

7.2 Crew Toilet Facilities located in proximity to food preparation areas.

7.2.1 Install toilet rooms for use by employees in proximity to the contiguous work area of all food preparation areas. ~~galleys, including lido galleys~~.

7.2.2 Ensure that toilet rooms are well-ventilated and equipped with

handwashing facilities. Install permanent signs in English (and other languages where appropriate) stating that handwashing is required.

7.2.3 Ensure that toilet rooms are completely enclosed and have tight-fitting, self-closing doors.

7.2.4 Ensure that the decks are constructed of hard, durable materials and are coved at the bulkhead-deck juncture to provide at least a 10 mm (3/8 inch) radius.

7.2.5 Ensure that deckheads and bulkheads are easily cleanable.

8.0 EQUIPMENT PLACEMENT AND MOUNTING

8.1 Permanently installed equipment may be sealed to the bulkhead, table-tops, counter-tops, and/or to adjacent equipment. For permanently installed equipment that is not sealed to bulkheads and adjacent equipment, spacing shall be based accessibility for cleaning. (These guidelines do not apply to open racks or other equipment of open design or easily movable equipment mounted on wheels or slides.)

When a piece of equipment is installed adjacent to another piece or a bulkhead, it should be so installed or located as to minimize the accumulation of foreign substances beneath it; and be separated a sufficient distance to permit cleaning between and behind the equipment.

The width of the space to be provided is dependent upon the distance from either end to the farthest point requiring cleaning.

8.1.1 When the distance to be cleaned is ~~For single pieces of equipment~~ less than 0.6 m (2 feet) long, provide at least 150 mm (6 inches) of clear, unobstructed space between adjacent equipment and between the equipment and bulkheads.

8.1.2 When the distance to be cleaned is ~~For pieces of equipment~~ greater than 0.6 m (2 feet) long but less than 1.2 m (4 feet) long, provide at least 200 mm (8 inches) of clear, unobstructed space between adjacent equipment and between the equipment and bulkheads.

8.1.3 When the distance to be cleaned is ~~For pieces of equipment~~ greater than 1.20 m (4 feet) long but less than 1.8 m (6 feet) long, provide at least 300 mm (12 inches) of clear, unobstructed space between adjacent equipment and between the equipment and bulkheads.

8.1.4 When the distance to be cleaned is ~~For pieces of equipment~~ greater than 1.8 m (6 feet) long, provide at least 460 mm (18 inches) of clear, unobstructed space between adjacent equipment and between the equipment and bulkheads.

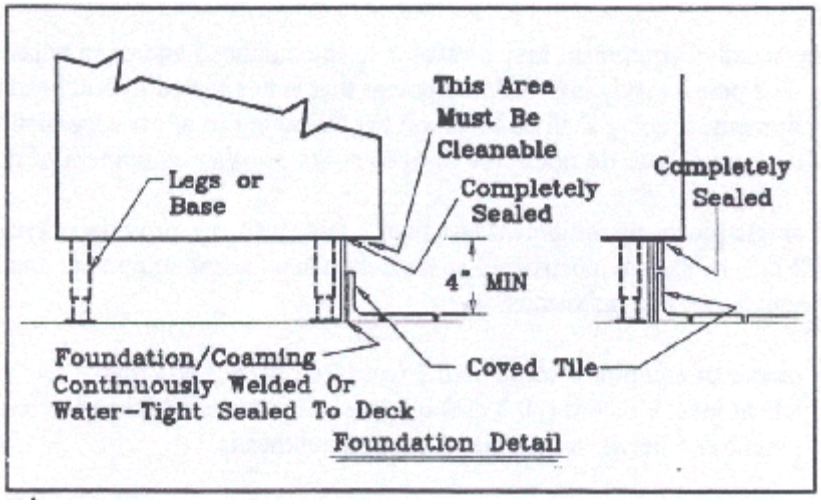
8.2 All equipment that is not classified as portable shall be fixed by continuous welding to stainless steel pads or plates on the deck. The stainless steel welding shall have smooth edges, rounded corners, and no gaps. Equipment may also be attached as an integral part of the deck surface by the use of glue, epoxy, or other durable adhesive product, provided the arrangement is smooth and easily cleanable. Equipment that locks in place shall be constructed to be free of gaps and crevices and shall be easily cleanable.

8.3 Deck-mounted equipment that is not easily movable shall be sealed to the deck or elevated on legs that provide at least a 150 mm (6 inch) clearance between the deck and the equipment. If no part of the deck under the deck-mounted equipment is more than 150 mm (6 inches) from the point of cleaning access, the clearance space may be only 100 mm (4 inches). Exceptions may also be granted if there are no barriers to cleanability, i.e., equipment, such as pulpers and warewashing machines with pipelines, motors and cables below where 150 mm (6 inches) clearance from the deck may not be practical.

8.4 Provide a minimum of at least 150 mm (6 inches) between equipment and the deckheads. If proper clearance cannot be achieved, extend the equipment through the deckhead panels and seal appropriately.

8.5 When mounting equipment on a foundation or coaming, ensure that the foundation or coaming is at least 100 mm (4 inches) above the finished deck. Use cement or a continuous weld to seal equipment to the foundation or coaming. Provide a sealed-type foundation or coaming for equipment not mounted on legs**.** Ensure that the overhang of the equipment from the foundation or coaming does not exceed 100 mm (4 inches). Completely seal any overhang of equipment along the bottom.

8.6 Ensure that table-mounted equipment, unless portable, is either sealed to the tabletop or mounted on legs at least 100 mm (4 inches) above the tabletop.



9.0 FASTENERS AND REQUIREMENTS FOR SECURING AND SEALING EQUIPMENT

9.1 Food Contact Surfaces

9.1.1 ~~Use continuous welds for~~ Attach all food contact surfaces or connections from food contact surfaces to adjacent splash zones to ensure a seamless, coved corner. ~~Use only continuous polished welds for food contact surfaces and splash zones adjacent to food contact surfaces. For splash zone attachments to the bulkhead, decking, or other equipment, use a continuous or tack-weld that is polished and sealed tight. Tack welds must not be spaced further than 750 mm (3 inches) apart.~~ Spot welding is not acceptable. All gaps shall be less than 1 mm (1/32 inch) before being sealed. ~~If used,~~ All bulkheads, deckheads, or decks receiving such attachments shall be reinforced. Seams sealed with approved sealant may be used in limited application when practical function or design requires. The excessive use of sealant shall be avoided.

9.1.2 Use of non-easily cleanable fasteners, e.g., exposed slotted screws, Phillips head screws, or pop rivets in food splash zones or on food contact surfaces is not permitted. Fasteners, when used**,** must be low profile, non-slotted, non-corroding, and easily cleanable.

9.2 Non-Food Contact Surfaces

9.2.1 For non-food contact surfaces of equipment, gaps and seams less than 3 mm (1/8 inch) may be sealed with an approved sealant. For those surfaces exposed to extreme temperatures or for gaps greater than 3 mm (1/8 inch), use only stainless steel profile strips. Avoid the excessive use of sealant.

9.2.2 Ensure that slotted screws, Phillips head or pop rivets and other fasteners used in non-food contact areas are constructed of corrosion-resistant materials.

9.3 Use of Sealants

9.3.1. Ensure that sealants are approved and appropriate for each application.

10.0 LATCHES, HINGES, AND HANDLES

10.1 Ensure that built-in equipment latches, hinges and handles are durable, non-corroding, and easily cleanable. Piano hinges shall not be used in food contact or splash zones, ~~food splash zones and exposed non-food contact zones.~~

11.0 GASKETS

11.1 Ensure that equipment gaskets for reach-in refrigerators, steamers, ice bins, ice cream freezers, and similar equipment are constructed of smooth, non-absorbent, non-porous materials.

11.2 Close and seal gaskets at their ends and corners and seal hollow sections.

11.3 Ensure that refrigerator gaskets are designed to be removable.

11.4 Ensure that fasteners used to install gaskets conform with the requirements specified for Section 9.0.

12.0 EQUIPMENT DRAIN LINES

12.1 Drain lines from refrigeration condensate unit evaporators, ventilation hoods, cold top tables, bains-marie, dipper wells, food preparation sinks and warewashing sinks or machines shall conform to these requirements:

12.1.1 Shall be constructed of stainless steel or other easily cleanable rigid or flexible material and sized appropriately. For custom built equipment ~~with~~ a minimum interior diameter of 25 mm (1 inch) is required.

12.1.2 Drain lines from the evaporators shall be sloped and extend through the bulkheads or decks and shall be directed through an accessible air gap or air break to a deck scupper or drain below the deck level or to a scupper outside.

12.1.3 Shall be installed to minimize the horizontal distance from the source of the drainage to the discharge.

12.1.4 Shall be installed at least 100mm (4 inches) above the deck when in a horizontal position and sloped to drain.

12.1.5 Shall drain through an air break or air gap to a drain or scupper.

12.2 All drain lines from hood-washing systems, cold top tables, bains-marie, dipper wells, food preparation sinks and warewashing sinks or machines shall conform to these requirements (with the exception of condensate drain lines):

12.2.1 Shall be less than 1m (3 feet) and free of sharp angles or corners, if designed to be cleaned in place by a brush.

12.2.2 Shall be readily removable for cleaning, if greater than 1.0 m (3 feet).

12.2.3 Shall drain through an air break or air gap to a drain or scupper.

12.2.4 Handwashing sinks, mop sinks and drinking fountains are not required to drain through an air break or air gap.

12.3 When possible, all installed equipment drain lines shall extend in a vertical line to a deck scupper drain. When this is not possible, the horizontal distance of the line shall be kept to a minimum.

13.0 ELECTRICAL CONNECTIONS, PIPELINES, AND OTHER ATTACHED EQUIPMENT

13.1 ~~Ensure that the electrical connections and control panels on all equipment and on the bulkhead are water tight waterproof. Use stainless steel to~~ Encase electrical wiring from permanently installed equipment in durable and easily cleanable material. Do not use braided or woven stainless steel electrical conduit outside of technical spaces or where it is subject to splash or soiling unless encased in easily cleanable plastic or similar easily cleanable material. Adjust the length of electrical cords to equipment that is not permanently mounted or fasten them in a manner that prevents the cords from lying on countertops.

13.2 Ozone or ultraviolet equipment shall not be installed in provisions rooms or food preparation areas unless such equipment is constructed of non-corroding stainless steel with fasteners meeting the requirements under Section 9.0.

13.3 Ensure that other bulkhead or deckhead mounted equipment such as phones, speakers, electrical control panels, or outlet boxes are sealed tight with the bulkhead or deckhead panels and are not placed in areas exposed to ~~moisture~~, food splash, or other splash areas ~~grease~~.

13.4 Tightly seal any areas where electrical lines, steam, or water pipelines penetrate the panels or tiles of the deck, bulkhead or deckhead. In addition, seal any openings or void spaces around the electrical lines or the steam or water pipelines and the surrounding conduit or pipelines.

13.5 Enclose steam and water pipelines to kettles and boilers in stainless steel cabinets or position the pipelines behind bulkhead panels. Keep exposed pipelines to a minimum. Cover any exposed, insulated pipelines with stainless steel or other durable, easily cleanable material.

14.0 HOOD SYSTEMS

14.1 Install hood systems or direct duct exhaust over warewashing equipment, including three-compartment sinks in pot wash areas where hot water is used for sanitizing, except undercounter warewashing machines.

14.1.1 For warewashing machines with direct duct exhaust, such exhaust shall be directly connected to the hood exhaust trunk where hot water is used for sanitization.

14.1.2 All exhaust hoods over warewashing equipment or three-compartment sinks shall be designed with a minimum 150 mm (6 inches) overhang from the edge of equipment so as to capture excess steam and heat.

14.1.3 Warewashing machines with direct duct exhaust to the ventilation system shall have a clean-out port in each duct that is located between the top of the warewashing machine and the hood system or deckhead.

14.1.4 The flat condensate drip pans located in the ducts from the warewashing machines shall be removable for cleaning.

14.2 Install hood systems above cooking equipment to ensure that they adequately remove excess steam and grease-laden vapors. For bains-marie or steam tables, excess heat and steam shall be controlled by either hood systems or dedicated local ventilation extraction.

14.3 Select proper sized exhaust and supply vents, and locate and balance them appropriately under expected operating conditions to ensure proper air conditioning, and capture and exhaust of heat and steam.

14.4 Where filters are used, ensure that they are ~~easily~~ readily removable.

14.5 Ensure that vents and duct work are accessible for cleaning. (Hood washing systems are recommended for removal of grease generated from cooking equipment).

14.6 In constructing hood systems, use stainless steel with coved corners to provide at least a 10 mm (3/8 inch) radius. Use continuous welds or profile strips on adjoining pieces of stainless steel. A drainage system is not required for normal grease condensate or cleaning solutions applied manually to hood assemblies. Drainage systems are required for hood assemblies using automatic clean-in-place systems.

14.7 Ventilation systems shall be installed in accordance with the manufacturer's recommendations and tested utilizing a method that determines if the system is properly balanced for normal operating conditions.

15.0 PROVISIONS ROOMS AND WALK-IN REFRIGERATORS AND FREEZERS

15.1 Bulkheads and Deckheads

15.1.1 Tight-fitting stainless steel bulkheads shall be provided in walk-in refrigerators and freezers and doors shall be lined with stainless steel.

15.1.2 Painted steel may be used for provisions passageways and in drystores areas. Light colors are recommended. Stainless steel panels are preferable for dry storage areas.

15.1.3 Provide bumper guards to protect bulkheads from forklift damage in passageways through which food is transferred.

15.2 Decks

15.2.1 Hard, durable, non-absorbent decking, e.g., tiles, or corrugated (e.g., diamond plate) stainless steel deck panels shall be used in refrigerated provisions rooms. All bulkhead and deck junctures shall be coved with a 10 mm (3/8 inch) radius and sealed tight. If a forklift will be used in this area, the stainless steel panels shall be sufficiently reinforced to prevent buckling.

15.2.2 Painted steel decking is acceptable in provisions passageways and drystores areas.

15.3 Provision Evaporators, Drip Pans, and Drain Lines

15.3.1 Ensure that the evaporators located in the walk-in refrigerators, freezers, and dry stores are constructed with stainless steel panels that cover piping, wiring, coils, and other difficult-to-clean components.

15.3.2 Ensure that the evaporator drip-pans are constructed of stainless steel, have coved corners, are sloped to drain, and are of sufficient strength to maintain slope.

15.3.3 Place non-metal spacers between the drip pan brackets and the interior edges of the pans.

15.3.4 Ensure that all fasteners comply with the guidelines in Section 9.0.

15.3.5 For freezer drip pans, provide a heater coil, and attach it to a stainless steel insert panel or to the underside of the drip pan. The panel shall be easily removable for cleaning of the drip pan. Ensure that heating coils provided for drain lines are installed inside of the lines.

15.3.6 Refrigeration condensate drip pans shall be located and sized to ensure catchment of drippage from the entire surface area of the evaporator unit.

15.3.7 Thermometer probes shall be encased in a stainless steel conduit and place in the warmest part of the room where food is normally stored.

16.0 GALLEYS, FOOD PREPARATION ROOMS, AND PANTRIES

16.1 Bulkheads and Deckheads

16.1.1 Construct bulkheads and deckheads, including doors, door frames, and columns with a high quality, corrosion resistant stainless steel. Ensure that the gauge is thick enough so that the panels do not warp, flex, or separate under normal conditions. For seams greater than 1mm (1/32 inch) but less than 3 mm (1/8 inch), use an approved sealant. For bulkhead and deckhead seams greater than 3 mm (1/8 inch), use only stainless steel profile strips.

16.1.2 All bulkheads to which equipment is attached shall be of sufficient thickness or reinforcement to allow for the reception of fasteners or welding without compromising the quality and construction of the panels.

16.1.3 Utility line connections shall be through a stainless steel or other easily cleanable, food service approved conduit that is mounted away from bulkheads for ease in cleaning.

16.1.4 Back splash attachments to the bulkhead shall be continuous or tack welded, polished and made watertight with an approved sealant.

16.1.5 All openings where piping and other items penetrate the bulkheads and deckheads must be sealed.

16.2 Decks

16.2.1 Decks shall be constructed of hard, durable, non-absorbent, non-skid material. All bulkhead and deck junctures shall be coved and sealed tight.

16.2.2 Seal all deck tiling with a durable, water-tight grouting material. Seal stainless steel deck plate panels with a continuous, non-corroding weld.

16.2.3 In technical spaces below undercounter cabinets, counters or refrigerators, the deck shall be a durable, non-absorbent, easily cleanable surface such as tile or stainless steel. Painted steel and concrete decking shall not be utilized.

16.2.4 All openings where piping and other items penetrate through the deck must be sealed.

17.0 BUFFET LINES, WAITER STATIONS, BARS, BAR PANTRIES AND OTHER FOOD SERVICE AREAS

17.1 Bulkheads and Deckheads

Bulkheads and deckheads may be constructed of decorative tiles; pressed metal panels; or other hard, durable, non-corroding materials. Stainless steel is not required in these areas. However, the materials used shall be easily cleanable.

Bar and bar pantry construction shall follow the same guidelines referenced in Sections 6.0 - 14.7 and 17.0 - 21.5.4.

17.2 Decks

17.2.1 Ensure that all buffet lines have hard, durable, non-absorbent decks that are at least 1 m (3 feet) in width measured from the edge of the service counter or from the outside edge of the tray rail, if such a rail is present.

17.2.2 Ensure that the dining room service stations have a hard, durable, non-absorbent deck, e.g., sealed granite or marble, at least 600 mm (2 feet) from the edge of the working sides of the service station.

17.2.3 Ensure that the decks behind service counters, under equipment, and in technical spaces are constructed of hard, durable, non-absorbent materials, e.g., tiles, epoxy resin, or stainless steel. Painted steel and concrete decking shall not be utilized.

17.2.4 Durable linoleum tile or durable vinyl deck covering may be used only in staff, crew or officers' dining areas.

17.2.5 All bulkheads and deck junctures shall be coved and sealed tight.

17.3 Food Display Protection

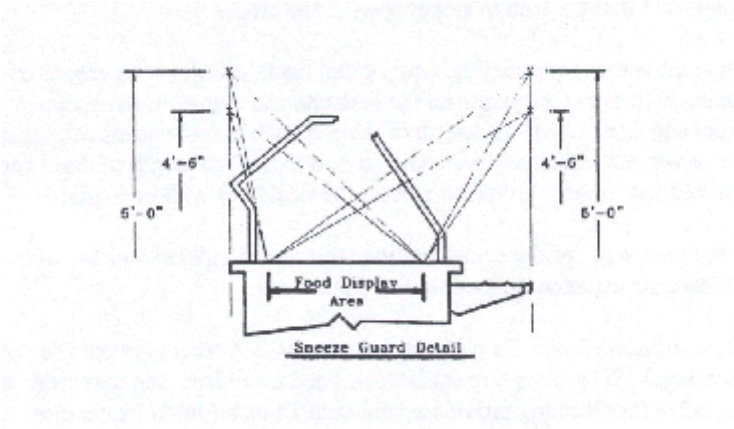
17.3.1 Effective means of protecting food, e.g., sneeze shields or display cases shall be provided in all areas where food is on display for consumption.

17.3.2 When sneeze guards are used, they shall meet the following criteria:

17.3.2.1 They may be temporary (portable), built-in, permanent, and integral parts of display tables, bains-marie, or cold-top tables.

17.3.2.2 Sneeze guard panels shall be durable plastic or glass that is smooth and easily cleanable. Sections of manageable lengths shall be removable for cleaning.

17.3.2.3 Sneeze guards shall be positioned in such a way that the sneeze guard panels intercept the line between the consumer's mouth and the displayed foods in accordance with NSF Standard #2. Factors such as the height of the food display counter, the presence or absence of a tray rail, and the distance between the edge of the display counter and the actual placement of the food shall be taken into account.



17.3.3 Tray rail surfaces shall be sealed and easily cleanable in accordance with guidelines for food splash zones.

17.4 Beverage Delivery System

17.4.1 Install a stainless steel, vented, double-check valve backflow prevention device in all bars that have carbonation systems, e.g., multi-flow beverage dispensing systems. Install the device before the carbonator and downstream from any copper in the potable water-supply line.

17.4.2 Encase supply lines to the dispensing guns for the beverage delivery system in a single tube. If the tube penetrates through any bulkhead or countertop, seal the penetration with a grommet.

17.4.3 Bulk dispensers of beverage delivery systems shall incorporate in their design a clean-in-place system that provides a means of flushing the entire interior of the dispensing lines in accordance with manufacturers' instructions.

18.0 Not Used (renumbering will be done on final)

19.0 WAREWASHING

19.1 For pre-washing, provide rinse hoses. Provide waste barrels, garbage grinder, or pulper system with adequate table space for all food preparation areas. Grinders are optional in pantries and bars. If a sink is to be used for pre-rinsing, provide a removable strainer.

19.2 For soiled dish tables with pulper systems, ensure that the pulper trough extends the full length of the table and that the trough slopes toward the pulper.

19.3 Seal the back edge of the soiled landing table to the bulkhead or provide a minimum of 460 mm (18 inch) clearance between the table and the bulkhead.

19.4 Soiled landing tables shall be ~~sloped~~ designed to drain waste liquids and preclude contamination of adjacent clean surfaces.

19.5 To prevent water from pooling, equip clean landing tables with across-the-counter gutters with drains at the exit from the machine and sloped to the scupper. Install a second gutter and drain line if the length of table is such that the first gutter at the exit from the machine does not effectively remove pooled water. The length of drain lines shall be minimized and when possible, they shall be straight vertical lines with no angles.

19.6 Provide sufficient space for cleaning around and behind equipment (e.g., pulpers and warewashing machines). Spacing requirements are covered in Section 8.0. For pieces of equipment greater than 1.8 m (6 feet), provide a minimum of 460 mm (18 inches) of clearance.

19.7 Encase pulper wiring in a durable and easy to clean ~~stainless steel or non-metallic watertight~~ conduit and raise it at least 150 mm (6 inches) above the deck. Elevate all warewashing machine components at least 150 mm (6 inches) above the deck, except as noted in Section 8.3.

~~19.8 Make all pump housings, electrical boxes, and other component equipment corrosion-resistant and waterproof. Make all pump housings, electrical boxes, and other component equipment corrosion-resistant and watertight (i.e. refer to IEC IP-44).~~

19.9 Construct removable splash panels of stainless steel to protect the pulper and technical areas.

19.10 Construct grinder cones, pulper tables, and dish-landing tables of stainless steel with continuous welding. Ensure that platforms for supporting warewashing equipment are constructed of stainless steel. Avoid the use of painted steel.

19.11 Ensure that warewashing machines are designed and sized for their intended use and that they are installed according to the manufacturer's recommendations.

19.12 Warewashing machines shall be provided with an easily accessible and readable data plate affixed to the machine by the manufacture that includes the machine's design and operating specifications including the:

a) temperatures required for washing, rinsing, and sanitizing:

b) pressure required for the fresh water sanitizing rinse unless the machine is designed to use only a pumped sanitizing rinse; and

c) conveyor speed for conveyor machines or cycle time for stationary rack machines.

19.13 Ensure that three-compartment warewashing sinks are correctly sized for their intended use and that they are large enough to submerge the largest piece of equipment used in the area that is served. Ensure that the sinks have coved, continuously welded, internal corners that are integral to the interior surfaces.

19.14 Install ~~either~~ one of the following arrangements to prevent excessive contamination of rinse water with wash water splash;

a) an across-the-counter gutter with a drain dividing the wash compartment from the rinse compartment

b) a splash shield at least 100 mm (4 inches) above the flood level rim of the sink between the wash and rinse compartments

c) an overflow drain in the wash compartment 100 mm (4 inches) below the flood level.

19.15 Equip hot water sanitizing sinks with accessible and easily readable thermometers, a long-handled stainless steel wire basket, and a jacketed or coiled steam supply with a temperature control valve to control water temperature. Three-compartment sinks that utilize halogen for the sanitization step do not require the aforementioned items necessary for hot water

sanitizing sinks.

19.15.1 Provide three-compartment warewashing sinks with a separate pre-wash station for the main galley and crew galley pot-washing areas.

19.15.2 For meat, fish and vegetable preparation areas, provide at least one three-compartment sink or an automatic warewashing machine with a pre-wash station.

19.15.3 Provide warewashing facilities accessible to all food preparation areas, such as the bakery, lido, and pantries.

19.16 Provide sufficient shelving for storage of soiled and clean ware. Minimum storage available for soiled ware should be approximately 1/3 the volume provided for clean ware. Either solid or open tubular shelving or racks are permitted. Design solid overhead shelves so that they drain at each end to the landing table below.

19.17 Provide adequate ventilation to prevent condensation on the deckhead or adjacent bulkheads. Any filters installed over warewashing equipment shall be easily removable.

20.0 LIGHTING

20.1 Ensure that a minimum of 220 lux (20 foot candles) of light is available at the work surface level in all food preparation and warewashing areas. For equipment storage, garbage and food lifts, garbage rooms, and toilet rooms, provide 220 lux (20 foot candles) of lighting at a distance of 760 mm (30 inches) above the deck.

20.2 For effective illumination, it is recommended that the deckhead mounted light fixtures be placed above the work surfaces and positioned in an "L" pattern rather than a straight line pattern.

20.3 Ensure that light fixtures are installed tightly against the bulkhead and deckhead panels and electrical penetrations are completely sealed in a manner that allows for easy cleaning around the fixtures.

20.4 Ensure that light shields on light fixtures are ~~shatterproof~~ shatter-resistant, and easily removable, and that they completely enclose the entire light bulb or fluorescent light tube(s).

20.5 Lighting levels shall be at least of 220 lux (20 foot candles) in provision rooms when measurements are taken while the rooms are empty. Lighting levels shall be of at least 110 lux (10 foot candles) during normal operations when foods are stored in the rooms.

20.6 In bars and dining room waiters' stations designed for lowered lighting during normal operations, provide 220 lux (20 foot candles) during cleaning operations.

20.7 Light bulbs shall be shielded, coated, or otherwise shatter-resistant in areas where there is exposed food; clean equipment, utensils, and linens; or unwrapped single-service, and single-use articles.

20.8 An infrared or other heat lamp shall be protected against breakage by a shield surrounding and extending beyond the bulb so that only the face of the bulb is exposed.

20.9 Decorative track or recessed deckhead-mounted lights above bar countertops, buffets, and other similar areas may be mounted on or recessed within the deckhead panels without being shielded. However, the bulbs installed in these light fixtures shall be the specially-coated, shatter-resistant ~~proof~~ type.

21.0 WASTE MANAGEMENT

21.1 Food and Garbage Lifts

21.1.1 Ensure that the interiors of food and garbage lifts are constructed of stainless steel and meet the same standards as Section 16.0.

21.1.2 Ensure that the decks are constructed of a durable, non-absorbent, non-corroding material and are coved at least 10 mm (3/8 inch) all along the sides.

21.1.3 Position bulkhead mounted air vents in the upper portion of the panels or in the deckhead.

21.1.4 Install a drain at the bottom of the lift shaft.

21.1.5 Ensure that the interiors of dumbwaiters are constructed of stainless steel and meet the same standards as used for other food service areas. Ensure that the bottom of the dumbwaiter is constructed of stainless steel and is coved to provide a 10 mm (3/8 inch) radius.

~~21.1.6 Ensure that electrical control panels are watertight (IEC IP-44).~~

21.1.7 Ensure that light fixtures are recessed or fitted with stainless steel guards to prevent breakage.

21.1.8 Trash or garbage chutes for transfer of waste material to storage or processing areas are prohibited.

21.2 Trolley, Waste Container, and Cleaning Equipment Wash Rooms

21.2.1 Construct bulkheads, deckheads, and decks to the same standards as Section 16.0 Provide a bulkhead-mounted pressure washing system with a deck sink and drain. (An enclosed automatic equipment washing machine or room may be used in place of the pressure washing system and deck sink).

21.2.2 Provide an easily accessible handwashing station for employees working in the area.

21.2.3 Provide adequate ventilation and extraction of steam and heat.

21.3 Garbage Holding Facilities

21.3.1 Construct a garbage- and refuse-storage or holding room of adequate size to hold unprocessed waste for the longest expected period where off-loading of waste is not possible. ~~itineraries~~. The refuse-storage room shall be physically separated from all food preparation and storage areas.

21.3.2 Ensure that the storage room is well-ventilated, temperature and humidity controlled. Provide a sealed, refrigerated space for storage of wet garbage that meets the same criteria utilized for cold storage facilities for food.

21.3.3 Provide an easily accessible handwashing station with a potable hot and cold water tap for a hose connection and a deck drain.

21.3.4 Provide deck drainage to prevent pooling of any water.

21.3.5 Ensure that bulkheads, deckheads and decks are easily cleanable. See 21.4.5

21.4 Garbage Processing Areas

21.4.1 Ensure that the garbage processing area is of adequate size for the operation and has a sufficient number of tables for sorting.

21.4.2 Ensure that the sorting tables are constructed of stainless steel, coved corners, and have rounded edges. Deck coaming, if provided, shall be at least 80 mm (3 inches) and coved. If the tables are provided with drains, direct the table drains to a deck drain and provide the deck drain with a strainer.

21.4.3 Ensure that the processing area includes a handwashing station, a potable hot and cold water tap for a hose, and an adequate number of deck drains.

21.4.4 Provide a storage locker for cleaning materials.

21.4.5 Ensure that all bulkheads and decks are easily cleanable. Provide an adequate number of deck drains. Provide berm/coaming around all waste-processing equipment and insure there is proper deck drainage.

21.4.6 Ensure that adequate lighting of at least 220 lux (20 foot candles) is provided at work surface levels.

21.4.7 A sink equipped with a pressure washer or an automatic washing machine shall be provided for the washing of equipment, storage containers, and garbage barrels.

21.5 Sewage Systems

~~21.5.1 Sewage systems shall be United States Coast Guard certified and meet any applicable Marpol Standards as well as United States Water Pollution Standards for Marine Sanitation Waste (Marine Sanitation Waste to be clarified).~~

21.5.2~~1~~ ~~Black and grey water lines that are above or that penetrate into the decks above containing galleys or other food storage, preparation, and display areas shall not have any mechanical couplings. Press-fitted piping is not acceptable over these areas~~. Drain lines carrying sewage or other liquid waste shall not pass directly overhead or horizontally through spaces used for the preparation, serving, or storage of food or the washing or storage of utensils and equipment. Drain lines that are unavoidable in these food areas shall be sleeve-welded, or butt welded and shall not have mechanical couplings. Press fitted piping shall not be used over these areas.

21.5.3 Black and grey water drain systems from cabins, food areas, and public spaces shall be designed to prevent the back-up of waste and the emission of odors or gases into these areas.

21.5.4 Sewage-holding tanks shall be vented, independent of all other tanks, to the outside of the vessel and away from any air intakes.

~~NOTE: ADDRESS RECLAIMED WATER FROM WASTE WATER HERE~~

22.0 POTABLE WATER SYSTEM

22.1 Bunker Stations

22.1.1 Ensure that the filling line is positioned at least 460 mm (18 inches) above the deck and is painted or striped auxiliary blue.

22.1.2 Ensure that the filling line has a tight-fitting cap fastened by a non-corroding chain so that it does not touch the deck when hanging.

22.1.3 Ensure that the screw connections for the hose attachments are unique, only fitting potable water hoses.

22.1.4 Label the filling line "POTABLE WATER FILLING" with at least 13 mm (½ inch) high lettering stamped, stenciled, or painted on the bulkhead in the area of the bunker line.

22.1.5 Filters may be used in the bunkering line before the halogenation injection point. Filters shall be accessible for inspection and removable for cleaning.

22.2. Filling Hoses

22.2.1 Provide hoses designed for potable water use that are durable with smooth, impervious linings, caps on each end, and fittings unique to the potable water connections.

22.2.2 Provide at least two 15 m (50 feet) hoses per bunker station.

22.2.3 ~~Ensure that each hose dedicated to potable water filling is properly labeled or tagged so that it is not used for any other purpose.~~ Potable water hoses shall be identified for use with the potable water.

22.3 Filling Hose Storage

22.3.1 Potable water hose lockers shall be constructed of smooth, nontoxic, corrosion resistant, easily cleanable material and shall be maintained in good repair.

22.3.2 The potable water hose lockers shall be mounted at least 450 mm (18 inches) above the deck and shall be self-draining.

22.3.3 Potable water hose lockers shall be marked “POTABLE WATER HOSE AND FITTING STORAGE” in letters at least 13mm (0.5 inch) high.

22.3.3 Provide storage space for at least four 15 m (50 feet) potable water bunker hoses per bunker station.

22.4 Fire/International Shore Connections and Technical Water Connections

22.4.1 Install a reduced pressure principle (RP) backflow prevention assembly to all connections where hoses from potable water supplies on shore will be connected.

22.5 Storage Capacity for Potable Water

22.5.1 Provide a minimum of 2 days' storage capacity, assuming 120 liters (30 gallons) of water per day per person for the maximum capacity of crew and passengers on the ship.

22.6 Potable Water Storage Tanks

22.6.1 General Requirements

22.6.1.1 Ensure that the tanks are independent of the shell of the vessel and do not share a common wall with tanks containing non-potable water or other liquids. Provide a 460 mm (18 inch) cofferdam above and between tanks that are not for storage of potable water and also between the tanks and the hull. Skin or double-bottom tanks are not allowed for potable water storage.

22.6.1.2 Ensure that 1) the coating of the tanks is approved for use in potable water tanks, 2) all manufacturer's recommendations for application and drying or curing are followed, and 3) documentation to that effect is issued.

22.6.1.3 Coat all items that penetrate the tank (e.g., bolts, pipes, pipe flanges) with the same product as the tank interior.

22.6.1.4 Ensure that the system is designed to be super-chlorinated one tank at a time through the filling line.

22.6.1.5 Ensure that lines for non-potable liquids do not pass through potable water tanks. Minimize the use of non-potable lines above potable water tanks. Lines above tanks shall not have any mechanical couplings. If coaming is present along the edges of the tank, provide slots along the top of the tank to allow leaking liquid to run off and be detected.

22.6.1.6 Treat welded pipes over the tanks in order to make them corrosion-resistant.

22.6.1.7 Treat all potable water lines inside potable water tanks so as to make them jointless and corrosion-resistant.

22.6.1.8 Identify each tank on its side and where clearly visible, with a number and the words "POTABLE WATER" in letters a minimum of 13 mm (½ inch) high.

22.6.1.9 Install sample cocks above the deck plating on each tank. Ensure that sample cocks point down, are identified for each tank, and are numbered.

22.6.2 Storage Tank Manholes

22.6.2.1 Install manholes on the sides of potable water tanks.

22.6.3 Storage Tank Water Level

22.6.3.1 Provide an automatic method for determining the water level for potable water tanks. Visual site glasses are acceptable.

22.6.4 Storage Tank Vents

22.6.4.1 Ensure that air-relief vents end well above the water line of the vessel. The cross-sectional area of the vent shall be equal to or greater than that of the filling line to the tank. The vent shall terminate with the open end turned down, or otherwise protected, and shall be screened with 16-mesh corrosion-resistant screen.

22.6.4.2 A single pipe may be used as a combination vent and overflow.

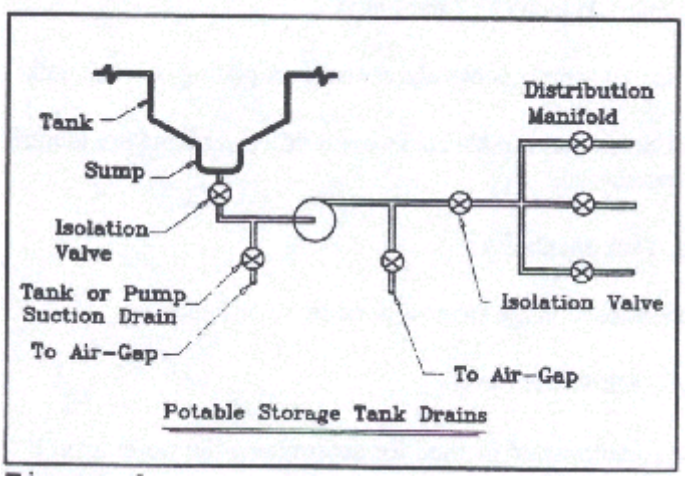
22.6.4.3 Do not connect the vent of a potable water tank to the vent of a non-potable water tank.

22.6.5 Storage Tank Drains

22.6.5.1 Design tanks to drain completely.

22.6.5.2 Ensure that the drain opening is at least 100 mm (4 inches) in diameter, ideally the same diameter as that of the inlet pipe.

22.6.5.3 When drainage is by suction pump, the water shall drain from a sump. Use separate pumps to drain tanks. In addition, locate the drain in the pump-discharge line ahead of any branch take-off to the distribution system. Install a valve on the main immediately beyond the drain line take-off.



22.7 Suction Lines

22.7.1 Locate suction lines at least 150 mm (6 inches) from the tank bottom or sump bottom.

22.8 Potable Water Distribution System

22.8.1 Locate distribution lines at least 460 mm (18 inches) above the deck plating or the normal bilge water level.

22.8.2 Ensure that the potable water distribution lines are not cross-connected with the piping of any non-potable water system lines.

22.8.3 Ensure that no lead or cadmium pipes, fittings, or solder are used.

22.8.4 Ensure that only potable water taps are installed in food areas, the hospital and the cabin showers and sinks.

22.8.5 Paint or stripe potable water piping and fittings in auxiliary blue ~~or stripe them with a blue band~~ at 5 m (15 feet) intervals and on each side of partitions, decks, and bulkheads except where decor would be marred by such markings.

22.8.6 Ensure steam that is not produced from potable water is only applied indirectly to food or food equipment and provided through coils, tubes or separate chambers. Steam applied directly to food and food contact surfaces shall only be produced from potable water and shall be generated locally by the food service equipment designed for this purpose (e.g., vegetable steamers, combi-ovens, etc).

22.8.7 Ensure that an air gap or approved backflow prevention device is present if potable water is supplied to a bilge, waste, ballast, or laundry tank.

22.8.8 Potable water tanks and any parts of the potable water distribution system shall be cleaned, disinfected, and flushed with potable water before the system is placed in service.

22.9 Potable Water Pressure Tanks

22.9.1 Ensure that potable water hydrophore tanks are not cross-connected to non-potable water tanks through the main air compressor.

22.9.2 Provide a filtered air supply from a non-permanent, quick-disconnect, or independent compressor. The compressor shall not emit oil into the final air product.

22.10 Potable Water Pumps

22.10.1 Ensure that the potable water pumps have adequate capacity for service demands and are not used for any other purpose.

22.10.2 Ensure that pumps prime automatically and not manually. Use

a direct connection, not an airgap, when supplying water to a potable water pump.

22.10.3 Ensure that pumps and distribution lines are the proper size so that pressure will be maintained at all times and at levels adequate to operate all equipment.

22.11 Evaporators and Reverse Osmosis Plants

22.11.1 Locate the seawater inlets (sea chests) forward of all overboard waste water and ballast tanks discharge outlets.

22.11.2 Use only direct connections to the potable water system. Swing lines are not allowed.

22.11.3 Provide an air gap or reduced pressure principle (RP) backflow assembly between the potable water system and the non-potable water system. (Fresh water produced by an evaporator, or reverse osmosis plant is not considered potable until after it has been pH ~~controlled~~ adjusted and to the proper level.)

22.11.4 Post operating ~~manufacturer's~~ instructions near the evaporator, or reverse osmosis plant.

22.11.5 Ensure that high- and low-pressure units connected directly to the potable water lines have the ability to go to the waste system if the distillate is not fit for use.

22.11.6 Ensure that units have a low-range salinity indicator, an operation temperature indicator, an automatic discharge to waste, and an alarm with trip setting.

22.11.7 Ensure that the high-saline discharge goes to bilge or overboard through an airgap or reduced pressure principle backflow prevention assembly.

22.12 Halogenation

22.12.1 Bunkering and Production

22.12.1.1 Provide labeled potable water taps with appropriate backflow preventers at each halogen supply tank.

22.12.1.2 Provide a labeled sample cock at least 3 m (10 feet) after the halogen injection point.

22.12.1.3 Ensure that halogen injection is controlled by a flow meter or analyzer.

22.12.1.4 Provide pH adjustment equipment for water bunkering and production. The analyzer, controller, and dosing pump shall be designed to accommodate changes in flow rates.

22.12.2 Distribution

22.12.2.1 Provide a completely automatic halogenation system that is controlled by an analyzer.

22.12.2.2 Ensure that the halogenation probe measures free halogen and is linked to an analyzer/controller and dosing pump.

22.12.2.3 Provide a back-up halogenation system with a switch-over that automatically begins pumping halogen when the primary (in-use) pump fails to provide adequate halogenation.

22.12.2.4 Ensure that all analyzer-chart recorders are located at a distant point in the system where significant water flow exists. The analyzer shall measure and indicate free-halogen.

22.12.2.5 Provide an audible alarm in a continually occupied watch station, e.g., the engine-control room, to indicate low free-halogen readings at the distant-point analyzer.

22.12.2.6 Provide labeled potable water taps with appropriate backflow preventers at halogen injection points.

22.12.2.7 Locate a labeled sample cock at least 3 m (10 feet) after the halogen injection point.

22.12.2.8 Provide free-halogen analyzer-chart recorders with ranges of 0 to 5.0 ppm and continuous recording periods indicating the level of free-halogen for 24 hours time periods, e.g., circular 24 hour charts. Test kits

provided to calibrate analyzer-chart recorders shall be capable of reading to in 0.2 ppm increments over a 0.0 to 5.0 ppm range. Electronic data loggers with certified data security features used in lieu of chart recorders shall produce records that conform to the principles of operation and data display required of the analog charts, including printing the records. Electronic data logging shall be in increments of ≤15 minutes.

22.13 Disinfection of the Potable Water System

22.13.1 Disinfect the entire distribution system with a free halogen concentration of at least 50 mg/L (ppm) for at least 4 hours.

22.13.2 Provide written documentation (letter) of the disinfection.

23.0 BACKFLOW PREVENTION

23.1 All non-potable connections to the potable water system shall use appropriate backflow prevention (e.g., air gaps, reduced pressure principal backflow prevention assemblies, pressure vacuum breakers, atmospheric vacuum beakers, pressure-type backflow preventers, or double-check valves with intermediate atmospheric vent).

23.2 Ensure that air gaps, the most reliable method of backflow protection, are at least double the diameter of the supply pipe measured vertically above the overflow of the rim of the vessel, and in no case less than 26 mm (1 inch).

23.3 In high-hazard situations where air gaps are impractical or cannot be installed, use a reduced pressure principle backflow prevention assembly.

23.4 If reduced pressure principle backflow prevention assemblies are used, provide a test kit for testing the devices annually. All RP's shall be tested after installation.

23.5 Use air gaps or mechanical backflow prevention devices when water must be supplied under pressure.

23.6 Install atmospheric vacuum breakers 150 mm (6 inches) above the fixture flood level rim with no valves downstream from the device.

23.7 Pressure-type backflow preventers (e.g., carbonator backflow preventer) or double-check valves with intermediate atmospheric vents prevent both back-siphonage and backflow caused by back pressure and shall be used in

continuous pressure-type applications.

23.8 Where potable water is directed to a black water tank for rinse down or other such us, it shall only be connected through an air gap. Reduced pressure principle backflow prevention assemblies are inadequate in this high hazard condition.

23.9 Ensure that the following connections to the potable water system are protected against backflow or back-siphonage by air gaps or mechanical backflow prevention devices:

~~23.9.1 Any connection between potable water tanks and non-potable water tanks.~~

~~23.9.2 The connection between evaporators, distillation or reverse osmosis plants and any non-potable water system.~~

~~23.9.3 The potable water supply to the boiler or boiler feed tanks.~~

~~23.9.4 The potable water supply to priming pumps used for non-potable applications.~~

~~23.9.5 The potable water supply to the lube and fuel oil separators.~~

~~23.9.6 Where potable water is supplied to a bilge, waste, ballast, or laundry tank.~~

~~23.9.7 The potable water supply to beverage system carbonators.~~

~~23.9.8 Hand held, flexible shower hoses in cabin showers and other areas, if the hoses can be submerged.~~

~~23.9.9 The connection between potable water and air conditioning supply or expansion tanks.~~

~~23.9.10 The potable water supply to the beauty salon hair rinse hoses.~~

~~23.9.11 The potable water supply line to photo development equipment and on all potable water taps in photography labs.~~

~~23.9.12 The potable water supply to garbage grinders and pulpers.~~

~~23.9.13 The potable water supply to waste and garbage rooms.~~

~~23.9.14 The potable water supply to the laundry machines.~~

~~23.9.15 All threaded faucets supplying potable water to which a hose may be connected.~~

~~23.9.16 All warewashing machines.~~

~~23.9.17 The potable water supply to x-ray developing tanks, sterilizers, and other hospital equipment connected to the potable water system.~~

~~23.9.18 The potable water supply to the fire suppression or sprinkler system.~~

~~23.9.19 The connection between fresh water and salt water ballast systems.~~

~~23.9.20 The potable water supply to swimming pools and whirlpools.~~

~~23.9.21 The potable water supply to toilet systems.~~

~~23.9.22 All potable water deck washing taps and engine room taps.~~

~~23.9.23 The potable water supply to the engine room pressure washing system.~~

23.9.1 Potable water supply lines to swimming pools, whirlpool spas, hot tubs, bathtubs, showers, and similar facilities.

23.9.2 Photographic laboratory developing machines and utility sinks.

23.9.3 Beauty and barber shop spray-rinse hoses.

23.9.4 Potable water faucets where hoses maybe connected.

23.9.5 Garbage grinders and pulpers.

23.9.6 Mechanical warewashing machines.

23.9.7 Hospital and laundry equipment.

23.9.8 Air conditioning expansion tanks.

23.9.9 Boiler feed water tanks.

23.9.10 Fire system.

23.9.11 Toilets.

23.9.12 Potable water, bilge, and sanitary pumps that require priming.

23.9.13 Freshwater or saltwater ballast systems.

23.9.14 International fire and technical water connections.

23.9.15 The potable water supply to automatic window washing systems utilizing chemicals or chemical mix tanks .

23.9.16 Water softeners for non-potable fresh water if located before an air gap.

23.9.17 Water softener and mineralizer drain lines shall be protected by an air gap or reduced pressure principle backflow prevention assembly.

23.9.18 Any other connection between potable and non-potable water systems.

24.0 SWIMMING POOLS

24.1 Use seawater, or a potable water supply passing through an air gap or backflow preventer to fill swimming pools.

24.2 Provide an independent pool drainage system. If swimming pool drains are connected to another drainage system, provide a double-check valve between the two. Install a drain at the lowest point in the pool.

24.3 Ensure that the bottom of the pool slopes toward the drains to effect complete drainage.

24.4 Provide anti-vortex type drain covers constructed of durable easily visible, easily cleanable material and that meet ASME/ANSI A112.19.8M voluntary standard for suction fittings (figure 3a-3c), or other drains that prevent entrapment hazards as specified in U.S. Consumer Product Safety Publication 363-009801 (figure 4a-4b).

FIGURE 3a. One type of Anti-Vortex Drain Cover. *Notice the top of the cover is domed.*

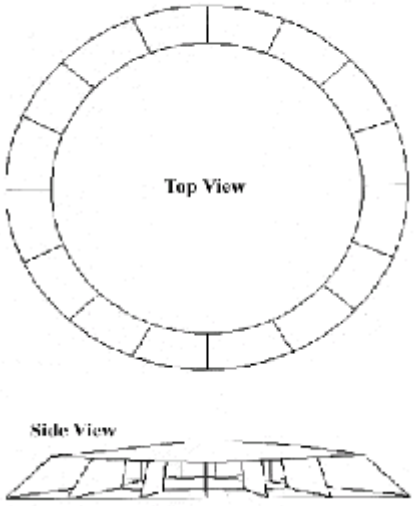


FIGURE 3b. Another type of design for Anti-Vortex Cover. *Note again the domed top of the cover.*

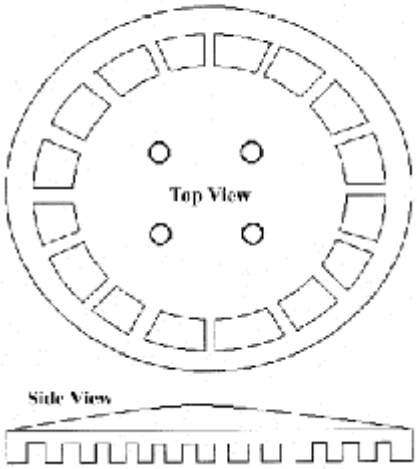


FIGURE 3c. Top and Side View of Suction Drain Cover. *The top of the cover may or may not be domed.*

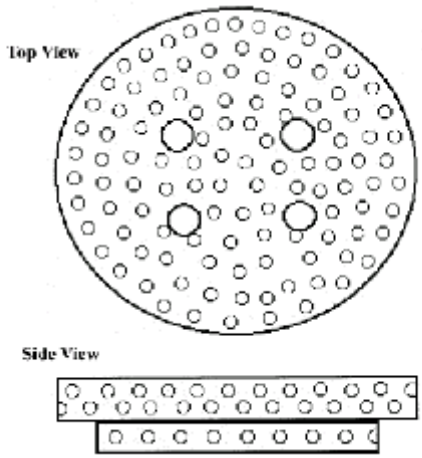


FIGURE 4a. Dual Drain System

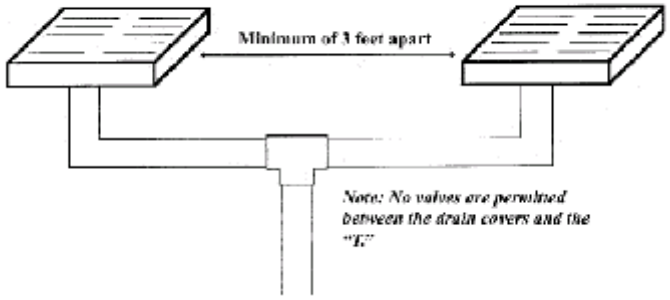
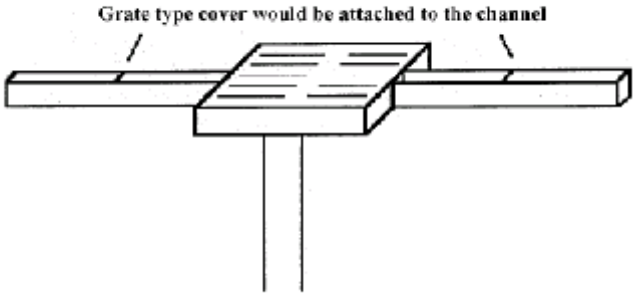


FIGURE 4b. Channel System



24.5 Ensure that the fill level of the pool is at the skim gutter level.

24.6 Ensure that pool overflows are either directed by gravity to the make-up tank for recirculation through the filter system or disposed of as waste.

24.7 Install recirculation, filtration, and disinfection equipment.

24.8 Pool water shall be turned-over at least four times every 24 hours (i.e., once every 6 hours or less).

24.9 Use self-priming, centrifugal pumps to recirculate pool water.

24.10 Install pumps large enough to recirculate the entire volume of the pool in 6 hours.

24.11 Ensure that surface skimmers are capable of handling approximately 80 percent of the filter flow of the recirculation system.

24.12 Provide at least one skimmer for each 47 m^2 (500 square feet) of pool surface area.

24.13 Provide a hair strainer between the pool outlet and the suction side of the pumps to remove foreign debris such as hair, lint, and pins, etc.

24.14 Ensure that the removable portion of the strainer is corrosion-resistant and has holes no greater than 6 mm (1/4 inch) in diameter.

24.15 Ensure that filters are designed to remove all particles greater than 10 micrometers from the entire volume of the pool in 6 hours or less.

24.16 Filters shall be cartridge, rapid-pressure sand filters, high-rate sand filters, diatomaceous earth filters, or gravity sand filters. Filter sizing shall be made consistent with ANSI standards for public pools.

24.17 All media-type filters shall be capable of being back-washed.

24.18 Provide filter accessories, such as pressure gauges, air-relief valves, and rate-of-flow indicators.

24.19 Provide automatic dosing of chemicals for disinfection and pH adjustment.

24.20 The make-up tank may be used to replace water lost by splashing and evaporation. If the tank is supplied with potable water, ensure that the supply enters through an air gap or backflow preventer. An overflow line at least twice the diameter of the supply line and located below the tank supply line may be used.

24.20 Provide easy access to the sand filters so that they can be inspected at least on a weekly basis and the media can be changed periodically.

24.21 Water sample points shall be provided on the system for the testing of halogen levels and routine calibration of the analyzer.

24.22 Ensure that disinfection is accomplished by chlorination or bromination and is controlled by an analyzer.

24.23 Ensure that pH adjustment is accomplished by using appropriate acids and bases and that a buffering agent is used to stabilize the pH. Injection of acids and bases shall be controlled by an analyzer.

24.24 Ensure that the pool mechanical room is accessible and well-ventilated and

that a potable water tap is provided in this room.

24.25 Mark all piping with directional-flow arrows and maintain a flow diagram and operational instructions in a readily available location.

24.26 Ensure that the pool mechanical room and re-circulation system are designed for easy and safe storage of chemicals and re-filling of chemical feed tanks.

24.27 Ensure that drains are installed in the pool mechanical room so as to allow for rapid draining of the entire pump and filter system and that a minimum 80 mm (3 inch) drain is installed on the lowest point of the system.

24.28 Wading pools shall have their own independent recirculation, filtration and halogenation system.

24.28.1 Ensure that the turn-over rate of water is at least once every 30 minutes.

24.28.2 Provide anti-vortex drain covers.

24.29 The depth of the pool shall be displayed prominently so that it can be seen from the deck and from in the pool. Additional depth markers shall be installed for every 1 m (3 feet) in change of depth and shall be displayed prominently so they can be seen from the deck and from in the pool.

25.0 WHIRLPOOL SPAS

25.1 Potable water supplied whirlpool systems shall be supplied through an air gap or approved backflow preventer.

25.2 Provide water filtration equipment that ensures a turn-over rate of at least once every 30 minutes and halogenation equipment that is capable of maintaining the appropriate levels of free-halogen throughout the use period.

25.3 Design the overflow system so that water level is maintained.

25.4 Provide one skimmer for every 14 m^2 (150 square feet) or fraction thereof of water surface area.

25.5 Provide an independent whirlpool drainage system. If the whirlpool drainage system is connected to another drainage system, provide a double-check valve between the two.

25.6 Provide drains and ensure the bottom of the whirlpool slopes toward the drains to effect complete drainage.

25.7 Provide anti-vortex type drain covers constructed of durable easily visible, easily cleanable material and that meet ASME/ANSI A112.19.8M voluntary standard for suction fittings (figure 3a-3c), or other drains that prevent entrapment hazards as specified in U.S. Consumer Product Safety Publication 363-009801 (figure 4a-4b).

25.8 Design the system to permit daily shock treatment or superhalogenation in accordance with CDC's *Final Recommendations To Minimize Transmission of Legionnaires' Disease From Whirlpool Spas On Cruise Ships, March 25, 1997, a*vailable from the VSP.

25.9 Install systems in a manner that permits routine visual inspection of the granular media filters in accordance with CDC's *Final Recommendations To Minimize Transmission of Legionnaires' Disease From Whirlpool Spas On Cruise Ships, March 25, 1997*.

25.10 Ensure that the fill level of the whirlpool is at the skim gutter level.

25.11 Ensure that whirlpool overflows are either directed by gravity to the make-up tank for recirculation through the filter system or disposed of as waste.

25.12 Use self-priming, centrifugal pumps to recirculate whirlpool water.

25.13 Install pumps large enough to recirculate the entire volume of the whirlpool in 30 minutes.

25.14 Provide a hair strainer between the whirlpool outlet and the suction side of the pumps to remove foreign debris such as hair, lint, and pins, etc.

25.15 Ensure that the removable portion of the strainer is corrosion-resistant and has holes no greater than 6 mm (1/4 inch) in diameter.

25.16 Ensure that filters are designed to remove all particles greater than 10 micrometers from the entire volume of the whirlpool in 30 minutes or less.

25.17 Filters shall be cartridge, rapid-pressure sand filters, high-rate sand filters, diatomaceous earth filters, or gravity sand filters. Filter sizing shall be made consistent with ANSI standards for public pools.

25.18 Design and install filters in a manner that allows for easy access for

inspection and maintenance.

25.19 All media-type filters shall be capable of being back-washed.

25.20 Ensure that filter accessories, such as pressure gauges, air-relief valves, and rate-of-flow indicators are provided.

25.21 The make-up tank may be used to replace water lost by splashing and evaporation. If the tank is supplied with potable water, ensure that the supply enters through an air gap or backflow preventer. An overflow line at least twice the diameter of the supply line and located below the tank supply line may be used.

25.22 Provide automatic dosing of chemicals for disinfection and pH adjustment.

25.23 Ensure that disinfection is accomplished by chlorination or bromination and is controlled by an analyzer

25.24 Water sample points shall be provided on the system for the testing of halogen levels and routine calibration of the analyzer.

25.25 Ensure that pH adjustment is accomplished by using appropriate acids and bases and that a buffering agent is used to stabilize the pH. Injection of acids and bases shall be controlled by an analyzer.

25.26 Ensure that the whirlpool mechanical room is accessible and well-ventilated and that a potable water tap is provided in this room.

25.27 Mark all piping with directional-flow arrows and maintain a flow diagram and operational instructions in a readily available location.

25.28 Ensure that the whirlpool mechanical room and re-circulation system are designed for easy and safe storage of chemicals and re-filling of chemical feed tanks.

25.29 Ensure that drains are installed in the whirlpool mechanical room so as to allow for rapid draining of the entire pump and filter system and that a minimum 80 mm (3 inch) drain is installed on the lowest point of the system.

26.0 MISCELLANEOUS

26.1 Facilities and Lockers for Cleaning Materials

26.1.1 Provide storage lockers for cleaning material and equipment. If wet brooms, mops, or other wet equipment are to be stored in the cleaning lockers, then the lockers shall be vented.

26.1.2 Provide bulkhead-mounted racks on which to hang wet brooms and mops, or provide sufficient space and hanging brackets within a cleaning locker. Bulkhead-mounted racks shall be located outside food storage, preparation, or service areas.

26.1.3 Provide stainless steel lockers with coved deck and wall junctures for storing buckets, detergents, sanitizers, and cloths.

26.1.4 The number of lockers and the location and size of lockers is determined by the needs of the vessel. Each area shall have convenient access to lockers containing cleaning materials.

26.1.5 Provide accessible facilities for cleaning mops and buckets separated from food facilities. ~~Cleaning facilities should include pressurized water and a properly drained mop sink.~~

26.1.6 Provide a sign “Cleaning Materials Only” for all cleaning lockers.

26.2 Filters

26.2.1 Water filters ~~to remove chlorine~~ may only be installed ~~used~~ at point-of-use e.g. beverage machines, ice machines, combi-ovens, etc. ~~coffee machines, juice machines, ice machines, and soda dispensing machines~~.

26.3 Drinking Fountains

26.3.1 Ensure that the water jet orifices from drinking fountains are slanted and that the orifice is protected by a cover to prevent contamination. The water storage tanks and plumbing in water fountains shall be lead free.

26.3.2 Provide drinking fountains with stainless steel cabinets in food ~~storage~~ preparation ~~and service~~ areas.

26.3.3 Ensure that the flow of the water stream from drinking fountains can be controlled by the user.

26.3.4 Ensure that drinking fountains are readily accessible to galley personnel.

26.4 Facility for Cleaning of Maintenance Equipment

26.4.1 Facilities such as deep utility sinks provided with hot and cold water or a pressure-washing system with a deck sink and drain shall be provided for cleaning of maintenance equipment such as brooms and mops. Bulkhead-mounted racks or hooks shall be provided for hanging the equipment for drying. Room(s) designated for this purpose shall be provided separate from food preparation and warewashing areas.

27.0 VENTILATION SYSTEMS

27.1 Air Supply Systems

27.1.1 Fan rooms shall be designed and located for accessibility to conduct periodic inspections and changing of air intake filters.

27.1.2 Air condition condensation collection pans shall be self-draining. Air condition condensate drainage from air chiller units shall be through closed piping to prevent pooling of wastewater on the decks.

27.1.3 Fan rooms shall be located so that any ventilation or processed exhaust air is not drawn back into the vessel.

27.1.4 All food preparation, warewashing, and toilet rooms shall have a sufficient air supply.

27.1.5 All cabin air vent diffusers shall be designed for easy removal and cleaning.

27.1.6 Air handling unit condensate drain pans and collection systems shall be accessible for inspection, maintenance, and cleaning. All major air supply trunks shall have access panels to allow for periodic inspection and cleaning.

27.1.7 A separate independent air supply system shall be provided for the engine room and other mechanical compartments, such as fuel separation or purifying rooms, which are located in and around the engine room.

27.2 Air Exhaust Systems

27.2.1 Air handling devices in the following areas shall exhaust air through independent systems that are completely separated from systems using recirculated air:

27.2.1.1 Engine rooms and other mechanical spaces.

27.2.1.2 Hospitals, infirmaries, and any rooms used for patient care.

27.2.1.3 Indoor swimming pools, dome type swimming pools when closed ~~that are on some occasions open and at other times closed~~, whirlpool spa facilities, and supporting mechanical rooms.

27.2.1.4 Galleys and other food preparation areas.

27.2.1.5 Cabin and public toilet rooms.

27.2.1.6 Waste processing areas.

27.2.2 Negative air pressure shall be maintained in the areas listed under Section 27.2.1.

27.2.3 A sufficient exhaust system shall be provided in all food preparation, warewashing and toilet rooms to keep them free of excessive heat, humidity, steam, condensation, vapors, obnoxious odors, and smoke.

27.2.4. All major air exhaust trunks shall have access panels to allow for periodic inspection and cleaning.

28.0 ~~CHILD CARE AND~~ CHILD ACTIVITY CENTERS ~~FACILITIES~~

28.2 If children who wear diapers are accepted in the child-activity or child-care facility, diaper-changing stations and disposal facilities shall be provided. Each station shall include:

28.2.1. A changing table that is impervious, nonabsorbent, nontoxic, smooth, durable, and cleanable, and designed for diaper changing;

28.2.2. A supply of disposable diapers, gloves, wipes, table cleanser, and disinfectant;

28.2.3. An airtight, soiled-diaper receptacle; and

28.2.4. An adjacent handwashing station.

28.2.5. Signs shall be posted in the diaper-changing station advising child-activity center staff to wash their hands after each diaper they change.

28.1 Provide toilet facilities with a covered waste receptacle inside all child activity centers (where children are separated from their parent or guardian). These facilities are to be located in a way that does not require children or providers to exit the immediate ~~care~~ activity area.

28.3 ~~Child care facilities and~~ child activity areas shall be provided with child-size toilets and handwashing facilities ~~sinks~~ that are easily accessible to children.

28.4 Separate toilet and handwashing facilities shall be provided for child care providers.

28.5. Handwashing facilities shall be accessible without barriers, such as doors, to each child care area.

28.6 Signs shall be posted near all handwashing facilities advisiong the providers to wash their hands and the children's hands after assisting children use the toilet.

~~28.6 If diaper changing stations facilities are provided, handwashing sinks shall be provided adjacent to diaper changing tables.~~

~~28.7 Diaper changing tables shall be easily cleanable and constructed of non-absorbent materials.~~

~~28.8 Durable, easily cleanable waste containers with tight-fitting lids for disposing of soiled diapers shall be provided for each diaper changing table.~~

~~28.9 Contamination of hands, toys and equipment in children's play areas appears to play a role in the transmission of diseases in child care settings. Provide toys and equipment that are easy to clean and sanitize.~~

29.0 ACKNOWLEDGMENTS

29.1 Individuals

29.1.1 The following individuals were involved in the writing and/or revising of this document:

29.2 Standards, Codes and Other References Reviewed For Guidance

29.2.1 NSF International *Certification Policies for Food Equipment* and ANSI/NSF International Standards 2-59, 1995-1997 http://152.160.209.3/listings/food.cfm

29.2.2 Underwriters Laboratories (UL), 1996 http://www.ul.com/services/index.html

29.2.3 American National Standards Institute/National Spa & Pool Institute, *Standard for Public Swimming Pools* and *Standard for Public Spas*, Standard 50, 1991 http://www.nsf .org/pools/poolstds.html

29.2.4 *National Health and Safety Performance Standards: Guidelines for Out-of-Home Child Care Programs*, 1993 http://nrc.uchs.edu/

29.2.5 FDA Food Code, 1997 and 1999 http://vm.cfsan.fda.gov/~dms/fc99-toc.html

29.2.6 International Electric Code, 1997 http://www.bocai.org/intlcode.htm

29.2.7 International Mechanical Code, 1997 http://www.bocai.org/intlcode.htm

29.2.8 International Plumbing Code, 1997 and 1998 http://www.bocai.org/intlcode.htm

29.2.9 National Standard Plumbing Code-Illustrated, 1993 http://www.buildingsite.com/bcl1.htm

29.2.10 Uniform Plumbing Code, 1994 http://www.buildingsite.com/bcl1.htm

29.2.11 *Vessel Sanitation Program Operations Manual*, 1989 and 2000
http://www.cdc.gov/nceh/programs/sanit/vsp/manual/draft/cover.htm

29.2.12 *Final Recommendations To Minimize Transmission of Legionnaires' Disease From Whirlpool Spas On Cruise Ships*, March 1997 (Available upon request from the VSP)

29.2.13 World Health Organization, *Guidelines for Drinking Water Quality*, 1993
http://www.who.int/dsa/cat98/water8.htm#Drinking-water quality Volume 1

29.2.14 World Health Organization, *Guide To Ship Sanitation*, 1967 (No longer in print)

29.2.15 U.S. Consumer Product Safety Commission, *Guidelines for Entrapment Hazards: Making Pools and Spas Safer,* Publication No. 363-009801.
http://www.cpsc.gov/cpscpub/pubs/chdrown.html

30.0 APPENDICES

30.1 Sample Letter of Request for Construction Inspection

Chief, Vessel Sanitation Program
National Center for Environmental Health
Centers for Disease Control and Prevention (CDC)
4770 Buford Highway, NE, (F16)
Atlanta, GA 30341-3724
Facsimile (770) 488-4127

We request the presence of USPHS representatives to conduct a construction inspection on the cruise vessel **(NAME)**. We tentatively expect to deliver the vessel on **(DATE**). We would like to schedule the inspection for **(DATE).** We expect the inspection to take approximately **(NUMBER OF DAYS).** We will pay CDC in accordance with the inspection fees published in the *Federal Register*.

For inspections occurring outside of the United States, we will reimburse the Vessel Sanitation Program for all expenses in connection with the on-site shipyard inspection and will make all necessary arrangements for lodging and transportation, which includes airfare and ground transportation in **(CITY, STATE, COUNTRY).** We will provide in-kind for lodging and transportation expenses. An invoice for all remaining expenses, such as en-route per diem and meals and miscellaneous expenses, including ground transportation to and from the airport nearest the representative's work site or residence, shall be sent to the following address:

Company
Attention:
Street Address
City, State, Country
Zip Code
Office Telephone Number
Office Fax Number

If you have any questions concerning this request, please contact:

(Signed)
Name and Title

30.2 VSP Contact Numbers

30.2.1 Atlanta Office
Vessel Sanitation Program
Centers for Disease Control and Prevention
4770 Buford Highway, NE (F16)
Atlanta, GA 30341-3724

Phone: (770) 488-7070
Fax: (770) 488-4127
E-mail: vsp@cdc.gov

30.2.2 Fort Lauderdale Office
Vessel Sanitation Program
Centers for Disease Control and Prevention
1850 Eller Drive, Suite 101
Ft Lauderdale, FL 33316-4201

Phone: 1-800-323-2132 or (954) 356-6650
Fax: (954) 356-6671

30.2.3 VSP Website

Updated information on this document and other VSP activities can be found on the VSP Website located at:
http://www.cdc.gov/nceh/vsp

30.3 VSP Construction Checklists and Vessel Profile Sheets

30.3.1 The VSP has developed checklists from these guidelines which may be helpful to shipyard and cruise industry personnel in achieving compliance with these guidelines. You may obtain copies of these checklists from the VSP Website.